2. [10 points] Indicate if each of the following statements are true or false by circling the correct answer. No justification is required.

a. [2 points] Let g be the inverse of the function f. If a and b are constants such that $a = f(b)$, then $b = g(a)$.

[True] False

b. [2 points] The line $2x - 3y + 100 = 0$ is perpendicular to the line $12y + 18x = 1$.

[True] False

Solution: The line $2x - 3y + 100 = 0$ has slope $m_1 = \frac{2}{3}$. The line $12y + 18x = 1$ has slope $m_2 = -\frac{3}{2}$. Since $m_1 m_2 = -1$, then the lines are perpendicular.

c. [2 points] Some of the values of the function K are given in the table.

u	-3	-1	2
$K(u)$	2	3	4

The function K could be linear.

True [False]

Solution: Looking at the rate of change between consecutive points in the table:

$$m_1 = \frac{3-2}{-1+3} = \frac{1}{2} \quad m_2 = \frac{4-3}{2+1} = \frac{1}{3} \quad \text{then } K(u) \text{ can't be a linear function.}$$

d. [2 points] Some of the values of the function Q are given in the table.

z	-3	-1	1	3
$Q(z)$	5	0.5	-2	-4

The graph of the function Q could be concave up .

[True] False

Looking at the rate of change between consecutive points in the table:

$$m_1 = \frac{0.5-5}{-1+3} = -2.25, \quad m_2 = \frac{-2-0.5}{1+1} = -1.25, \quad m_3 = \frac{-4+2}{3-1} = -1.$$

then the graph of the function $Q(x)$ can be concave up.

e. [2 points] If $f(x) = 2x + 1$ and $g(x) = x^2 + 1$ then $f(g(x)) = 2x^2 + 3$.

[True] False

Solution: $f(g(x)) = f(x^2 + 1) = 2(x^2 + 1) + 1 = 2x^2 + 3$.